

## SERIES B/SB SURFACE MOUNT and PLUG-IN

**Hi Reliability  
Ultra-Miniature  
Isolated DC-DC Converters  
Up to 2.5 Watts**

This series of unregulated DC-DC converters comes in a miniaturized encapsulated package. 188 different models are available. The units feature single and isolated dual outputs. They will operate over the temperature range of -25° C to +70° C. No heat sink is required.

### TYPICAL CHARACTERISTICS:

**Low Profile 0.3" Height! Up to 2.5 Watts  
No Heat Sink or Electrical Derating Required**

#### OPTIONS AVAILABLE

- Per Mil. Std. 883
- Expanded operating temp. (-55° C to +85° C)
- Stabilization Bake (125° C ambient)
- Temperature Cycle (-55° C to +125° C)
- Hi Temp, full power burn in (100% power, 125° C case temp)

#### FEATURES

- Up to 2.5 watt output at 70° C ambient
- Encapsulated semiconductors, conservatively rated for maximum reliability
- Ultra-miniature size (0.3" Height)
- 6 input voltage ranges 5, 12, 15, 24, 28 and 48V DC
- 100 megohm @ 500V DC isolation
- Single and dual isolated output
- No heat sink required

- **Test conditions:** 25° C ambient and input voltage at nominal value unless otherwise specified.

**LINE REGULATION:** OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT.

**Input voltage range:**

- 5V models: 4 to 6.5V DC
- 12V models: 9 to 15V DC
- 15V models: 12 to 18V DC
- 24V models: 17 to 28V DC
- 28V models: 21 to 32V DC
- 48V models: 25 to 50V DC

- **Output voltage tolerance at full load:**

- 5V models  $\pm 0.25V$
- 9V models  $\pm 0.3V$
- 12V & 15V models  $\pm 0.4V$
- 24V & 28V models  $\pm 0.5V$
- 48V models  $\pm 0.7V$

- **Converter frequency:** 20 - 40 KHz

**Output temperature coefficient:** 0.02%/°C

**Operating temperature:** -25° C to +70° C ambient. No heat sink is required.

**Storage temperature:** -55° C to +125° C

**Isolation:** 100 megohms min. @ 500V DC

**Short circuit protection:** Temporary

### SERIES B/SB - SINGLE OUTPUT

PICO Plug-In Part Number	PICO Surface Mount Part Number	Input Volt. (V DC)	Output Volt. (V DC)	Max. Load Current (mA)	Max. Output Power (watts)	Eff. @ Full Load Typical (%)	Input Current Full Load Typical (mA)	Output Volt. Ripple @ Full Load* (Vp-p max)	No Load Current Typical (mA)	Full Load Output Voltage Tolerance (V DC)	Price (US \$)
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5B3.3S	5SB3.3S	5	3.3	454	1.5	60	500	0.15	90	±0.2	63.17
5B5S	5SB5S	5	5	300	1.5	67	447	0.15	90	±0.25	63.17
5B5.2S	5SB5.2S	5	5.2	288	1.5	67	447	0.15	90	±0.25	63.17
5B9S	5SB9S	5	9	167	1.5	73	411	0.15	90	±0.3	63.17
5B12S	5SB12S	5	12	125	1.5	75	400	0.15	90	±0.4	63.17
5B15S	5SB15S	5	15	100	1.5	75	400	0.15	90	±0.4	63.17
5B24S	5SB24S	5	24	63	1.5	78	385	0.15	90	±0.5	63.17
5B28S	5SB28S	5	28	54	1.5	78	385	0.15	90	±0.5	63.17
5B48S	5SB48S	5	48	31	1.5	79	380	0.15	90	±0.7	63.17
12B3.3S	12SB3.3S	12	3.3	454	1.5	60	208	0.15	40	±0.2	63.17
12B5S	12SB5S	12	5	300	1.5	69	182	0.15	40	±0.25	63.17
12B5.2S	12SB5.2S	12	5.2	288	1.5	69	182	0.15	40	±0.25	63.17
12B9S	12SB9S	12	9	222	2.0	76	219	0.15	40	±0.3	63.17
12B12S	12SB12S	12	12	167	2.0	78	214	0.15	40	±0.4	63.17
12B15S	12SB15S	12	15	133	2.0	78	214	0.15	40	±0.4	63.17
12B24S	12SB24S	12	24	83	2.0	80	208	0.15	40	±0.5	63.17
12B28S	12SB28S	12	28	71	2.0	80	208	0.15	40	±0.5	63.17
12B48S	12SB48S	12	48	42	2.0	80	208	0.15	40	±0.7	63.17
15B3.3S	15SB3.3S	15	3.3	454	1.5	60	167	0.15	34	±0.2	63.17
15B5S	15SB5S	15	5	300	1.5	69	145	0.15	34	±0.25	63.17
15B5.2S	15SB5.2S	15	5.2	288	1.5	69	145	0.15	34	±0.25	63.17
15B9S	15SB9S	15	9	222	2.0	76	175	0.15	34	±0.3	63.17
15B12S	15SB12S	15	12	167	2.0	78	171	0.15	34	±0.4	63.17
15B15S	15SB15S	15	15	133	2.0	78	171	0.15	34	±0.4	63.17
15B24S	15SB24S	15	24	83	2.0	80	167	0.15	34	±0.5	63.17
15B28S	15SB28S	15	28	71	2.0	80	167	0.15	34	±0.5	63.17
15B48S	15SB48S	15	48	42	2.0	80	167	0.15	34	±0.7	63.17
24B3.3S	24SB3.3S	24	3.3	454	1.5	60	104	0.15	10	±0.2	63.17
24B5S	24SB5S	24	5	300	1.5	69	91	0.15	10	±0.25	63.17
24B5.2S	24SB5.2S	24	5.2	288	1.5	69	91	0.15	10	±0.25	63.17
24B9S	24SB9S	24	9	222	2.0	76	110	0.15	15	±0.3	63.17
24B12S	24SB12S	24	12	167	2.0	78	107	0.15	15	±0.4	63.17
24B15S	24SB15S	24	15	133	2.0	78	107	0.15	15	±0.4	63.17
24B24S	24SB24S	24	24	104	2.5	82	127	0.15	15	±0.5	63.17
24B28S	24SB28S	24	28	89	2.5	81	129	0.15	15	±0.5	63.17
24B48S	24SB48S	24	48	52	2.5	82	127	0.15	15	±0.7	63.17
28B3.3S	28SB3.3S	28	3.3	454	1.5	60	89	0.15	15	±0.2	63.17
28B5S	28SB5S	28	5	300	1.5	67	80	0.15	15	±0.25	63.17
28B5.2S	28SB5.2S	28	5.2	288	1.5	67	80	0.15	15	±0.25	63.17
28B9S	28SB9S	28	9	222	2.0	75	95	0.15	15	±0.3	63.17
28B12S	28SB12S	28	12	167	2.0	77	93	0.15	15	±0.4	63.17
28B15S	28SB15S	28	15	133	2.0	77	93	0.15	15	±0.4	63.17
28B24S	28SB24S	28	24	104	2.5	81	110	0.15	15	±0.5	63.17
28B28S	28SB28S	28	28	89	2.5	81	110	0.15	15	±0.5	63.17
28B48S	28SB48S	28	48	52	2.5	82	109	0.15	15	±0.7	63.17
48B3.3S	48SB3.3S	48	3.3	454	1.5	60	52	0.20	3	±0.2	67.77
48B5S	48SB5S	48	5	300	1.5	71	44	0.20	3	±0.25	67.77
48B5.2S	48SB5.2S	48	5.2	288	1.5	71	44	0.20	3	±0.25	67.77
48B9S	48SB9S	48	9	222	2.0	76	55	0.20	3	±0.3	67.77
48B12S	48SB12S	48	12	167	2.0	82	51	0.20	3	±0.4	67.77
48B15S	48SB15S	48	15	133	2.0	82	51	0.20	3	±0.4	67.77
48B24S	48SB24S	48	24	104	2.5	84	62	0.20	3	±0.5	67.77
48B28S	48SB28S	48	28	89	2.5	83	63	0.20	3	±0.5	67.77

\* The ripple is measured with a 22µF, 75 volt high quality tantalum capacitor which is required across the output.

Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York **Delivery--stock to one week for sample orders.**

## SERIES B/SB - DUAL OUTPUT

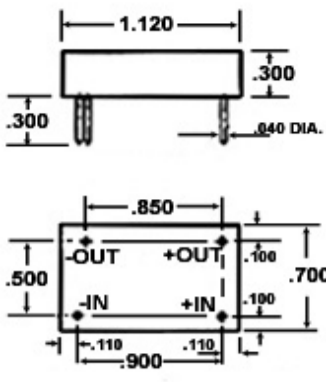
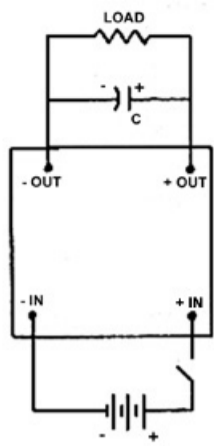
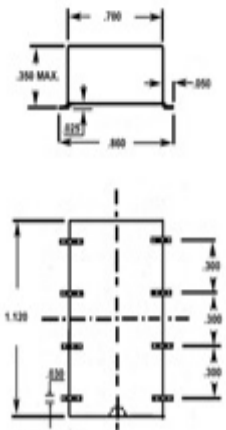
PICO Plug-In Part Number	PICO Surface Mount Part Number	Input Volt. (V DC)	Output Volt. (V DC)	Max. Load Current per Output (mA)	Max. Output Power per Output (watts)	Eff. @ Full Load Typical (%)	Input Current Full Load Typical (mA)	Output Volt. Ripple @ Full Load* (Vp-p max)	No Load Current Typical (mA)	Full Load Output Voltage Tolerance (V DC)	Price (US \$)
5B5D	5SB5D	5	5	150	0.75	68	441	0.15	90	±0.25	76.38
5B9D	5SB9D	5	9	83	0.75	73	411	0.15	90	±0.3	76.38
5B12D	5SB12D	5	12	62	0.75	76	394	0.15	90	±0.4	76.38
5B15D	5SB15D	5	15	50	0.75	78	384	0.15	90	±0.4	76.38
5B24D	5SB24D	5	24	31	0.75	80	375	0.15	90	±0.5	76.38
5B28D	5SB28D	5	28	27	0.75	78	385	0.15	90	±0.5	76.38
5B48D	5SB48D	5	48	15	0.75	79	380	0.15	90	±0.7	76.38
12B5D	12SB5D	12	5	150	0.75	71	176	0.15	40	±0.25	76.38
12B9D	12SB9D	12	9	111	1.0	76	219	0.15	40	±0.3	76.38
12B12D	12SB12D	12	12	83	1.0	81	205	0.15	40	±0.4	76.38
12B15D	12SB15D	12	15	66	1.0	81	205	0.15	40	±0.4	76.38
12B24D	12SB24D	12	24	41	1.0	83	200	0.15	40	±0.5	76.38
12B28D	12SB28D	12	28	35	1.0	80	208	0.15	40	±0.5	76.38
12B48D	12SB48D	12	48	21	1.0	80	208	0.15	40	±0.7	76.38
15B5D	15SB5D	15	5	150	0.75	71	141	0.15	34	±0.25	76.38
15B9D	15SB9D	15	9	111	1.0	76	175	0.15	34	±0.3	76.38
15B12D	15SB12D	15	12	83	1.0	81	165	0.15	34	±0.4	76.38
15B15D	15SB15D	15	15	66	1.0	81	165	0.15	34	±0.4	76.38
15B24D	15SB24D	15	24	41	1.0	83	161	0.15	34	±0.5	76.38
15B28D	15SB28D	15	28	35	1.0	80	167	0.15	34	±0.5	76.38
15B48D	15SB48D	15	48	21	1.0	80	167	0.15	34	±0.7	76.38
24B5D	24SB5D	24	5	150	0.75	71	88	0.15	10	±0.25	76.38
24B9D	24SB9D	24	9	111	1.0	76	110	0.15	15	±0.3	76.38
24B12D	24SB12D	24	12	83	1.0	80	104	0.15	15	±0.4	76.38
24B15D	24SB15D	24	15	66	1.0	81	102	0.15	15	±0.4	76.38
24B24D	24SB24D	24	24	52	1.25	82	127	0.15	15	±0.5	76.38
24B28D	24SB28D	24	28	45	1.25	81	129	0.15	15	±0.5	76.38
24B48D	24SB48D	24	48	26	1.25	82	127	0.15	15	±0.7	76.38
28B5D	28SB5D	28	5	150	0.75	67	80	0.15	15	±0.25	76.38
28B9D	28SB9D	28	9	111	1.0	75	95	0.15	15	±0.3	76.38
28B12D	28SB12D	28	12	83	1.0	77	93	0.15	15	±0.4	76.38
28B15D	28SB15D	28	15	66	1.0	77	93	0.15	15	±0.4	76.38
28B24D	28SB24D	28	24	52	1.25	81	110	0.15	15	±0.5	76.38
28B28D	28SB28D	28	28	45	1.25	81	110	0.15	15	±0.5	76.38
28B48D	28SB48D	28	48	26	1.25	82	109	0.15	15	±0.7	76.38
48B5D	48SB5D	48	5	150	0.75	71	44	0.20	3	±0.25	81.98
48B9D	48SB9D	48	9	111	1.0	76	55	0.20	3	±0.3	81.98
48B12D	48SB12D	48	12	83	1.0	82	51	0.20	3	±0.4	81.98
48B15D	48SB15D	48	15	67	1.0	82	51	0.20	3	±0.4	81.98
48B24D	48SB24D	48	24	52	1.25	84	62	0.20	3	±0.5	81.98
48B28D	48SB28D	48	28	45	1.25	83	63	0.20	3	±0.5	81.98

\* The output is measured with a 22µF, 75 volt high quality tantalum capacitor which is required across each output.

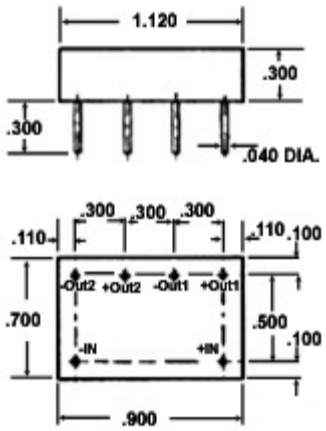
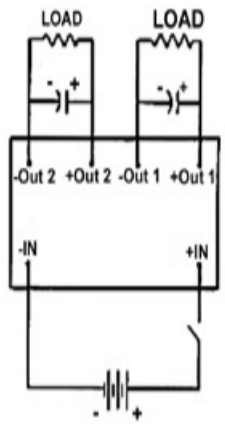
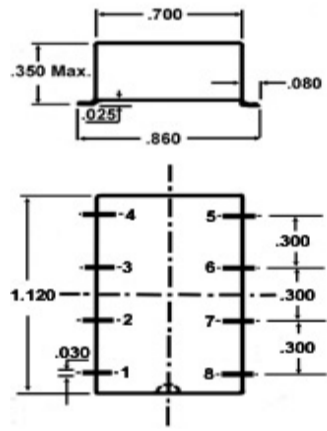
Ordering Instructions: No minimum. Net 30 days F.O.B. Pelham, New York

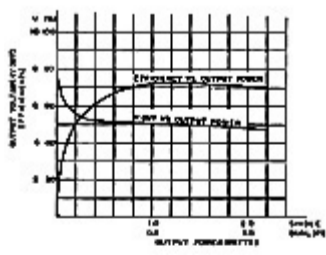
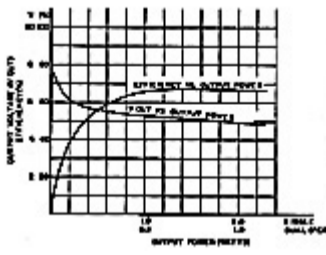
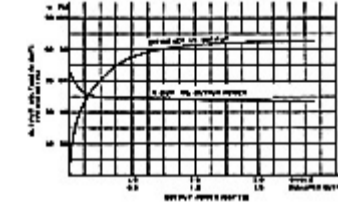
**Delivery--stock to one week for sample orders.**

### Series B/SB Single Output

<p><b>B Single</b></p>  <p>Bottom View Larger Size Drawing [1]</p>	<p>Typical Weight: 8.0 Grams</p>  <p>Larger Size Schematic [2]</p>	<p><b>SB Single</b></p>  <p>Bottom View Larger Size Drawing [3]</p>	<table border="1"> <thead> <tr> <th>Pin no.</th> <th>Single</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-INP</td> </tr> <tr> <td>2</td> <td>N/C</td> </tr> <tr> <td>3</td> <td>N/C</td> </tr> <tr> <td>4</td> <td>+INP</td> </tr> <tr> <td>5</td> <td>+OUT</td> </tr> <tr> <td>6</td> <td>-OUT</td> </tr> <tr> <td>7</td> <td>N/C</td> </tr> <tr> <td>8</td> <td>N/C</td> </tr> </tbody> </table>	Pin no.	Single	1	-INP	2	N/C	3	N/C	4	+INP	5	+OUT	6	-OUT	7	N/C	8	N/C
Pin no.	Single																				
1	-INP																				
2	N/C																				
3	N/C																				
4	+INP																				
5	+OUT																				
6	-OUT																				
7	N/C																				
8	N/C																				

**Series B/SB Dual Output**

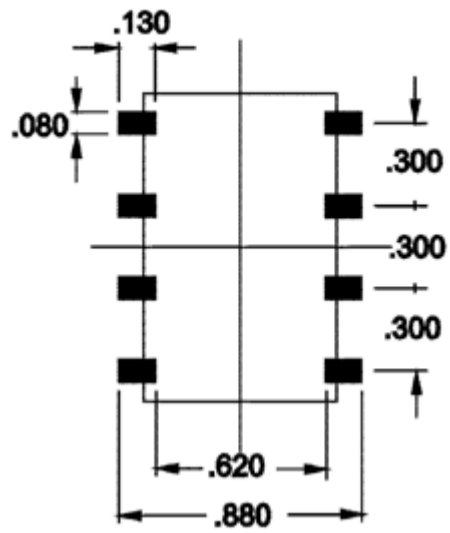
<p><b>B Dual</b></p>  <p>Bottom View Larger Size Drawing [4]</p>	<p>Typical Weight: 8.5 Grams</p>  <p>Larger Size Schematic [5]</p>	<p><b>SB Dual</b></p>  <p>Bottom View Larger Size Drawing [6]</p>	<table border="1"> <thead> <tr> <th>Pin no.</th> <th>Dual</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-INP</td> </tr> <tr> <td>2</td> <td>N/C</td> </tr> <tr> <td>3</td> <td>N/C</td> </tr> <tr> <td>4</td> <td>+INP</td> </tr> <tr> <td>5</td> <td>+OUT 1</td> </tr> <tr> <td>6</td> <td>-OUT 1</td> </tr> <tr> <td>7</td> <td>+OUT 2</td> </tr> <tr> <td>8</td> <td>-OUT 2</td> </tr> </tbody> </table>	Pin no.	Dual	1	-INP	2	N/C	3	N/C	4	+INP	5	+OUT 1	6	-OUT 1	7	+OUT 2	8	-OUT 2
Pin no.	Dual																				
1	-INP																				
2	N/C																				
3	N/C																				
4	+INP																				
5	+OUT 1																				
6	-OUT 1																				
7	+OUT 2																				
8	-OUT 2																				

<p>SINGLE &amp; DUAL 48V - 5V</p>  <p>Larger Size Graph [7]</p>	<p>SINGLE &amp; DUAL 5V - 5V</p>  <p>Larger Size Graph [8]</p>	<p>SINGLE &amp; DUAL 24V - 24V</p>  <p>Larger Size Graph [9]</p>
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**RECOMMENDED LAND PATTERN DIMENSIONS**

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## Series SB



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For immediate engineering assistance or to place an order:

**Call Toll Free: 800-431-1064**

**PICO Electronics, Inc.**

143 Sparks Ave. Pelham, NY 10803

Tel: 914-738-1400 or Fax: 914-738-8225

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